

WHAT IS CLAIMED IS:

1. A method of making a reduced intensity hurricane, comprising:
 - positioning a plurality of submersibles in a hurricane interception area, the hurricane interception area describing an area of ocean through which at least a portion of the hurricane's central core will pass within a predetermined amount of time;
 - maneuvering the plurality of submersibles to a predetermined depth;
 - maintaining the plurality of submersibles in the hurricane interception area at the predetermined depth for the predetermined amount of time; and
 - releasing a gas from the plurality of submersibles after the plurality of submersibles have entered the hurricane interception area, the gas being released during the predetermined amount of time, the gas forming bubbles which rise in a plume toward a surface of the ocean, the plume entraining water from at least the predetermined depth and upwelling the entrained water toward the surface of the ocean to cool the surface of the ocean, the cooled surface reducing the intensity of the hurricane whose portion of central core passes through the hurricane interception area.
2. The method of claim 1, wherein the predetermined depth is a depth greater than the depth of a thermocline below the surface of the ocean in the hurricane interception area.
3. The method of claim 1, wherein the predetermined amount of time is in the range of about 3 to about 24 hours.
4. The method of claim 1, wherein the entrained water is upwelled at a predetermined rate, such that the total amount of upwelled water achieves a predetermined sea surface temperature reduction.
5. The method of claim 1, wherein a required cross track dimension of the interception area is substantially one half of the diameter of the hurricane's central core.
6. The method of claim 1, wherein the step of releasing occurs after the hurricane's intensification phase has ceased.

7. The method of claim 1, wherein the bubbles are formed at a predetermined diameter and rise from a release surface of a predetermined cross-sectional area.

8. A method of reducing the intensity of a hurricane, comprising:

staging a plurality of mobile submersibles in an interception area around a forecast hurricane position, the plurality of mobile submersibles distributed across a distribution area comparable to a mean position forecast error of the forecast hurricane position;

reducing, in accordance with a reduced mean position forecast error as the hurricane approaches the plurality of mobile submersibles, the distribution area of the plurality of mobile submersibles to a predetermined area; and

generating, after the step of reducing, at least one bubble plume from at least one of the plurality of mobile submersibles, the at least one bubble plume upwelling water from a predetermined depth to a surface of the ocean, the upwelled water cooling the surface of the ocean, the cooled ocean surface reducing the intensity of the hurricane.

9. The method of claim 8, wherein the predetermined area is an area between about 30% to about 100% of the size of the hurricane's central core.

10. The method of claim 8, wherein the predetermined depth is a depth greater than the depth of a thermocline below the surface of the ocean in the predetermined area.

11. The method of claim 8, wherein the bubble plume comprises bubbles formed at a predetermined diameter and rising from a release surface of a predetermined cross-sectional area.

12. The method of claim 8, wherein the upwelled water is upwelled at a predetermined rate, such that the total amount of upwelled water achieves a predetermined sea surface temperature reduction.

13. The method of claim 8, wherein the step of generating occurs after the hurricane's intensification phase has ceased.

14. A method of reducing the intensity of a hurricane, comprising:

positioning a plurality of submersibles below an ocean's surface in an area of the ocean above which at least a portion of the hurricane's central core will pass, the ocean's surface having a sea surface temperature;

generating at least one bubble plume from the plurality of submersibles; and

upwelling water by action of the at least one bubble plume, wherein the water is upwelled at a predetermined rate such that the total amount of upwelled water achieves a predetermined sea surface temperature reduction at the conclusion of a predetermined period of time.

15. The method of claim 14, wherein the plurality of submersibles are positioned below the ocean's surface at a depth greater than the depth of a thermocline.

16. The method of claim 14, wherein the portion of the hurricane's central core is between about 30% to about 100% of the size of the hurricane's central core.

17. The method of claim 14, wherein the predetermined period of time is in the range of about 3 to about 24 hours.

18. An apparatus to generate a bubble plume to upwell seawater, comprising:

a collector hood defining a cavity to releasably collect a gas, the collector hood having a first opening to accept the gas and a second opening to release the gas; and

a cover sealing the second opening, the cover including perforations penetrating the cover, the perforations having a predetermined shape, size, and spacing to produce a predetermined rate of upwelling of seawater.

19. The apparatus of claim 18, wherein the cavity is defined as having a truncated conical shape, the conical shape having a first opening corresponding to a base of the conical shape and a second opening parallel to the first opening, the second opening smaller than the first opening.

20. The apparatus of claim 18, further comprising a duct to receive at least a portion of the generated bubble plume, the duct having:

a first end proximal to the cover, the first end retained in a position that is separated from the cover, the separation defining a gap, wherein the gap allows entry of seawater that is entrained and upwelled through the duct by the generated bubble; and
a second end distal to the cover.

21. The apparatus of claim 20, wherein a distance between the first end and the second end of the duct can be one of increased and decreased.

22. The apparatus of claim 20, wherein the gap can be one of increased and decreased.

23. The apparatus of claim 20, wherein the duct is manufactured from a reinforced architectural fabric.

24. The apparatus of claim 20, wherein the duct includes vertical baffles to divide the duct into a plurality of parallel sections.

25. The apparatus of claim 20, further comprising a buoyant collar coupled to the second end of the duct.

26. An apparatus for the generation of a bubble plume in seawater, comprising:
a gas source; and
a gas manifold including:

a chamber,
a first aperture coupling the gas source and the chamber, and
a second aperture to release the gas contained within the chamber, the second aperture sealed by a cover having perforations of a predetermined shape, size, and spacing to produce a predetermined rate of upwelling of seawater entrained in the bubble plume generated by a release of gas from the second aperture.

27. The apparatus of claim 26, further comprising a duct to receive at least a portion of the bubble plume, the duct having:

a first end proximal to the second aperture, the first end retained in a position that is separated from the second aperture, the separation defining a gap, wherein the gap allows entry of seawater that is entrained and upwelled through the duct by the bubble plume generated from the release of gas from the second aperture; and

a second end distal to the second aperture.

28. The apparatus of claim 27, wherein a distance between the first end and the second end can be one of increased and decreased.

29. The apparatus of claim 27, wherein the gap can be one of increased and decreased.

30. The apparatus of claim 27, wherein the duct is manufactured from a reinforced architectural fabric.

31. The apparatus of claim 27, wherein the duct includes vertical baffles to divide the duct into a plurality of parallel sections.

32. The apparatus of claim 27, further comprising a buoyant collar coupled to the second end of the duct.